Social Exclusion: A Self-Threat?

THESIS

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By

Monika Elizabeth Gaspar

Undergraduate Program in Psychology

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Thesis Committee:

Jennifer Crocker, Advisor and Baldwin Way

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For my dad

Abstract

Ego-threats are defined as events in which an individual's desired positive self-images or self-esteem is challenged (Leary et al., 2009). Research has shown that ego-threats, such as stereotype threat (Schmader & Johns, 2003), interfere with working memory capacity. Social exclusion has been shown to have similar effects as ego-threats such as decreased prosocial behavior (Twenge et al., 2007), increased aggression (Buckley et al., 2004) and risk-taking (Twenge et al., 2002), and impaired cognitive functioning (Baumeister et al, 2002). We are investigating social exclusion as a possible self-threat rather than primarily a social threat. We predicted that social exclusion's effects on cognitive functioning are due to individual differences in contingencies of self-worth, specifically appearance, others' approval, and competition, but not rejection sensitivity. We tested our hypothesis by including relevant moderator variables, manipulating social exclusion, and measures of working memory capacity and intellectual performance. Results showed that social exclusion decreases cognitive performance on an intelligence test, and that this effect is moderated by individual differences in contingencies of self-worth (N= 82).

Imagine meeting your boyfriend or girlfriend for breakfast the morning before a very important exam. Just as you arrive, your boyfriend or girlfriend unexpectedly announces that they would like to break up and then immediately leaves, letting you process what just happened. You end up failing your exam since you were unable to focus on your goal of good test performance due to the intrusive thoughts of your break up. Romantic break-ups can be threatening for the ego and induce feelings of worthlessness, because individuals tend to invest their self-esteem in relationships (Park, Sanchez, & Brynildsen, 2011a); ego-threats are defined as events in which an individual's desired positive self-images or self-esteem is challenged (Leary, Terry, Allen, & Tate, 2009). A number of ego-threats have been investigated, including stereotype threat, academic competence threats, self-objectification, and social exclusion (e.g., Schmader & Johns, 2003; Heatherton & Vohs, 2002; Fredrickson et al., 1998, Baumeister, Twenge, & Nuss, 2002).

Social exclusion from a group for a brief or extended period of time, threatens our belongingness with others, which in turn results in severe psychological, behavioral, and cognitive impairments. These negative effects may be involved in poor immune system function (Kiecolt-Glaser, Garner, et al., 1984), a higher incidence of psychopathology (Bhatti, Derezotes, Kim, & specht, 1989; Hamacheck, 1992), increased suicide tendencies (Trout, 1980), and involvement in crime (Sampson & Laub, 1993). Social exclusion has also been shown to decrease prosocial behavior (Twenge, Baumeister, DeWall, Ciarcco, & Bartels, 2007), increase aggression (Buckley, Winkel, & Leary, 2004) and risk-taking (Twenge, Catanese, & Baumeister, 2002), and also impair cognitive functioning, which are both necessary components of successful social interactions and to restore belonging (Baumeister et al., 2005).

Ego-threats and Cognitive Functioning

Stereotype threat and working memory capacity. Working memory is defined as a system that includes encoding, maintaining, and retrieving information, goals, and strategies necessary to perform a task (Unsworth & Engle, 2007). High working memory capacity predicts the ability to maintain the goal of a task by controlling attention (e.g. focusing on a test) and ignoring intrusive information (e.g. a break up) while performing the task (e.g. taking the exam) (Kane & Engle, 2003; Kane et al., 2007; Rosen & Engle, 1998). This suggests that working memory is necessary in situations that require complex cognitive processing (Schmader, Johns, & Forbes, 2008).

Stereotype threat has been shown to decrease working memory capacity (Schmader & Johns, 2003). Stereotype threat is a situation in which an individual receives explicitly negative information confirming a relevant stereotype about one's group (Steele, 1997). For example, men are better at performing on math tests than women. In a study examining the effects of stereotype threat on working memory capacity, women's performance decreased on a math test described as gender sensitive (Schmader & Johns, 2003). Group performance differences disappeared when the stereotype threat was removed. The main mechanism underlying this effect was working memory capacity; stereotype threat impairs working memory capacity which in turn decreases math test performance. There is also evidence that social exclusion impairs cognitive performances (Baumeister, Twenge, & Nuss, 2002).

Anticipated loneliness and intellectual performance. Baumeister, Twenge, and Nuss (2002, Study 1) conducted a study in which they investigated the effect of social exclusion on higher order cognitive skills (e.g. reading comprehension, analytical, verbal, mathematical, and spatial abilities). Participants completed a personality inventory and were later given fake

feedback. Participants were assigned to one of three groups: they were told they would end up alone early in life and would have difficulty forming relationships later on (Future Alone condition), they were told that they would likely have long and rewarding relationships throughout their life (Future Belonging condition), or they would be likely to be accident prone later in life (Misfortune Condition). Anticipated loneliness and social exclusion are conceptually similar manipulations of social exclusion because in either manipulation, an individual's need of belongingness is threatened. Participants in the Future Alone condition performed significantly worse on an intelligence test than participants in the other two conditions. In a follow up study about the effects of social exclusion on learning and memory (Baumeister, Twenge, & Nuss, 2002, Study 2) individuals in the Future Alone condition performed significantly worse on a recall task than individuals in either of the other two conditions. These results suggest that exclusion impairs intellectual performance and cognitive processing when conscious, executive control is required. This is important, because conscious intelligent thought and mindful cognitive processing are necessary components for constructive behavior in situations when one's self-esteem is threatened. However, there may be individual differences in how people are impaired in their cognitive capacities when experiencing rejection.

Potential Moderators of the Effect of Social Exclusion on Cognitive Functioning

There are likely moderators of the effect of social exclusion on cognitive performance. We think it is important to discover specifically which moderators, because social exclusion is experienced universally. Two possible moderators of social exclusion effects may be contingencies of self-worth (Crocker & Wolfe, 2001) and rejection sensitivity (Downey & Feldman, 1996).

Contingencies of self-worth. An ego-threat's negative effects are determined by an individual's self-esteem (Deci and Ryan, 1995). Some individuals have a contingent self-esteem that refers to feelings about one's self that result from trying to match some standard of excellence (Ryan & Deci, 2001). Individual differences exist between the various areas an individual can stake his or her self-esteem in, also known as contingencies of self-worth (Crocker, & Wolfe, 2001). External contingencies of self-worth (e.g. other's approval, one's appearance, competition, and academic competence) should be more difficult to satisfy than internal contingencies of self-worth (e.g. God's love, family support, and virtue) because they depend on other's approval and behavior rather than one's own behavior and accomplishments and are more outside of one's control (Crocker & Wolfe, 2001). Contingencies of self-worth based on appearance and other's approval are highly correlated with lower trait self-esteem and contingencies of self-worth based on competition and academic competence have been found to correlate with general- approval factors (Crocker & Wolfe, 2001). When one's self-worth is based on these extrinsic contingencies of self-worth, they require continual validation from others in order to feel good about themselves (Crocker & Knight, 2005). Social exclusion results from the behavior of other individuals which is out of our control; therefore we chose to focus specifically on the external contingencies of self-worth as potential moderators of social exclusion's impairment in cognitive processing. We believe that social exclusion threatens one's sense of self-worth when it is highly staked on external contingencies and that this ultimately impairs one's cognitive capacities.

Rejection sensitivity. Some people anxiously and readily perceive intentional rejection from others, a trait known as rejection sensitivity (Downey & Feldman, 1996). Social anxiety correlates highly with rejection sensitivity (Feldman & Downey, 1994), which is thought to

motivate individuals to avoid social interactions when they feel they will not be able to make a positive impression on others (Schlenker & Leary, 1982). Rejection sensitivity stems from a fear and expectancy of being rejected in social situations. Research shows that rejection sensitive individuals are more likely to interpret intentional rejection in a stranger's ambiguously rejecting behavior of others (Downey & Feldman, 1996). Rejection sensitivity is considered to be a possible link between social exclusion and cognitive impairment (Baumeister & Leary, 1995). However, we propose that social exclusion, like stereotype threat, is more related with rejection of the core of one's self-esteem rather than an individual's fear of rejection in social situations.

The Present Study

We tried to replicate a mechanism similar to stereotype threat for social exclusion (Schmader, Johns, & Forbes, 2008). First we hypothesized that social rejection impairs cognitive functions related to intelligence and working memory capacity. Second, we postulated that social exclusion is a self-threat moderated by individual differences in contingencies of self-worth, specifically appearance, others' approval, and competition. We believe when individual's are in situations in which they are socially excluded, other's approval, one's appearance, and competition more accessible than contingencies of self-worth based on academics. We do not expect contingencies of self-worth based on academics to moderate these effects because we do not intend on directly challenging individuals' academic competence.

Methods

Participants

Participants were 82 undergraduates students from The Ohio State University (*62% males*) who received partial REP credit for participation in an hour – long study. 85.5% were Caucasian, 10.8% were African American, 2.4% were Asian, 1.2% had another racial

background, and all participants were native English speakers. Average age was 19.36 years (*SD*= 1.50).

Materials and Procedure

We presented all materials on the computer, using MediaLab (Jarvis, 1997) and Direct RT (Jarvis, 2012). The experiment included the measurement of moderator variables in the beginning of the study, a manipulation of social exclusion, and measures of working memory capacity and intelligence as dependent variables.

We ran participants in groups of four to five. Participants were told that the researchers were studying teamwork interactions with minimal knowledge of one's partner. However, this was a cover story to disguise the true purpose of the study. Upon arrival, the experimenter received informed consent from participants.

Moderator variables. Then, the experimenter led participants to separate cubicles where they completed the Rejection Sensitivity Questionnaire (RSQ; Downey & Feldman, 1996) the appearance, other's approval, competition, and academic competence subscales of the Contingencies of Self-Worth Scale which measure the external contingencies of self-worth (CSW; Crocker et al., 2003). The Rejection Sensitivity Questionnaire consists of a series of 18 rejection-relevant situations, for example, "You ask your boyfriend/girlfriend to move in with you." For each situation, participants first rated how concerned they felt about the outcome of the situation on a scale of 1(*very unconcerned*) to 7(*very concerned*) as an indicator of their rejection concern in a given situation (e.g.,. "How concerned or anxious would you be over whether or not the person would want to move in with you?"). Then participants rated the likelihood of rejection by assigning a value between 1 (*very unlikely*) to 7 (*very likely*) as an indicator of their rejection expectancy in a given situation (e.g., "I would expect that he/she

would want to move in with me"). We calculated rejection sensitivity scores by reverse-scoring the rejection expectancy scores for each item and multiplying rejection concern and reversed rejection expectancy scores for each situation and then averaged up the scores across the 18 situations for each participant. We then measured external contingencies of self-worth (CSW), specifically appearance (e.g. "When I think I look attractive I feel good about myself"), other's approval (e.g. "I can't respect myself if other's don't respect me") competition (i.e. "I feel worthwhile when I perform better than others on a task or skill"), and academic competence (i.e. "Doing well in school gives me a sense of self-respect"). Participants responded on a scale ranging from 1 (*strongly agree*) to 7 (*strongly disagree*). We reverse-scored some of the items and then averaged them up to create the appearance, other's approval, competition, and academic competence subscales of the CSW scale.

Social exclusion manipulation. Afterwards, participants took part in a get-to-know group ice breaker activity. The ice breaker activity lasted about 15 minutes. During this time participants learned each other's names and got acquainted with each other using a set of provided questions (e.g., Why did you come to OSU? What is your major?) Then, participants returned to their cubicles and selected two potential partners for the remainder of the study. Subsequent feedback about the partner assignment was random. Participants in the social exclusion condition were told:

> "Usually what I do is look at those sheets at those sheets everyone filled out saying who they want to work with. This time no one happened to choose you. So, because of that you will have to complete some pre-testing questionnaires and tasks for a different study alone. This will allow you to still receive credit for participating today."

Participants in the control condition were told, "We won't be doing the partner task for a while. In the meantime, I'm going to have you complete some pre-testing questionnaires and tasks for a

different study." This paradigm reliably manipulates social exclusion (Nezlek, Kowalski, Leary, Blevins, & Holgate, 1997; Baumeister, Twenge, & Nuss, 2002).

Dependent variables. First, participants completed the Operation Span Task as a measure of working memory capacity (Schmader & Johns, 2003). The instructions included a brief description of the Operation Span Task. For this task, participants categorized words while being presented with words to memorize; words to memorize remained on the screen for two seconds. In between each word to memorize, there were two words to categorize as a word or non-word (i.e. Categorize: loving, glamorous, Memorize: Dust). The task consisted of twelve trials with 4-6 words per trial to memorize. At the end of each trial, participants indicated all the words they could recall from a given trial. We coded the measure by only counting the trials in which participants recalled all words. The score for each trial was the sum of the maximum number of words of a trial. This type of coding is frequently used with this measure (e.g., Schmader & Johns, 2003). Afterwards, participants had six minutes to complete as many questions as possible on an intelligence test, specifically the General Mental Abilities Test (GMAT; Janda, 1996) which measures verbal, mathematical, and spatial aspects of intelligence. We calculated three different scores to indicate performance on this measure. First, we counted the problems each participant attempted. In addition, we counted the number of problems each participant solved. Based on these scores, we also calculated the success rate for each participant on the test by dividing the number of problems solved by the number of problems attempted. This last score is the best indicator of performance on the GMAT because it shows how accurate participants were. Finally, participants were probed for suspicion about the cover story and the procedures of the study, debriefed about the true purpose of the study, and thanked for their participation.

Results

Main Effects of Social Exclusion on Cognitive Processes

We controlled for gender and race in all analyses. We recoded the race variable into 0 for Caucasian and 1 for all others since 85.5% of participants were Caucasian. Using Analyses of Variance (ANOVAs) to analyze main effects of experimental condition, we found support for our hypothesis that social exclusion decreases intellectual performance (see Table 1). We found a very significant difference between social exclusion and control condition on general mental abilities test performance (success rate= right/attempted), $F(1, 81) = 7.11$, $p < .01$, $\eta^2 = .08$. Results approached marginal significance when analyzing the number of problems solved, $F(1, 81) = 2.58$, $p = .11$, $\eta^2 = .03$, or the number of problems attempted, $F(1, 81) = 2.34$, $p = .13$, $\eta^2 = .03$. Socially excluded participants solved fewer problems, but attempted more problems than participants in the control condition. We also found support for our hypothesis that social exclusion decreases working memory capacity. There was a marginally significant difference between the social exclusion condition and control condition, $F(1, 81)= 3.10$, $p <.10$, $\eta^2 = 04$ (see Table 1).

Table 1
Performance on General Mental Abilities Test (GMAT) and Operation-Span Task by experimental condition, controlling for gender and race

Condition and variable	Socially Rejected		Control		
	M	*SD*	*M*	*SD*	*F*(1, 81)
GMAT					
No. right	20.16	5.34	21.78	5.43	2.58
No. attempts	43.00	7.62	41.04	6.66	2.34
Success rate (right/attempts)	.48	.13	.54	.15	7.11**
Words recalled	27.14	13.34	32.49	13.67	3.10^{+}

$^{+}p < .10$, $*p < .05$, $**p < .01$

Moderator Effects

We hypothesized that individual differences in contingencies of self-worth, not rejection sensitivity, would moderate effects of experimental condition on working memory capacity and intellectual performance. In order to test for moderation, we conducted several multiple regression analyses following the recommendations by Aiken and West (1991). We used dummy coding for our analyses, coding the control condition as 0 and social exclusion condition as 1. We also mean centered the moderators. Our post hoc analyses also followed the procedure laid out in Aiken and West (1991); we tested for simple slopes within a given condition by coding this condition as 0 and the other condition as 1. The effect of the moderator variable in the regression model represents the effect of the moderator in the condition coded as 0. Additionally, we examined condition effects at high (1*SD* above the mean) and low (1*SD* below the mean) levels of moderators. We used this procedure in all of our moderator analyses.

Appearance Contingency of Self-Worth. We found a significant interaction between experimental conditions and self-worth contingent on appearance in predicting intelligence test

success rate, β = -.30, $p < .05$, $\Delta R^2 = .05$ (see Table 2 and Figure 1). Post Hoc analyses revealed that among participants who based their self-esteem strongly on appearance, the exclusion group had a lower success rate than the control group on the intelligence test, β = -.47, $p < .01$. There were no significant differences in success rates between participants in the control condition who were low in self-worth contingent on appearance, and participants in the control condition who were high in self-worth contingent on appearance, between participants in the exclusion condition who were low in self-worth contingent on appearance and participants in the exclusion condition who were high in self-worth contingent in appearance, and between experimental conditions for participants low in self-worth based on appearance, *p*s > .42.

Table 2
Hierarchical regressions of GMAT success rate from social exclusion condition, contingencies of self-worth based on appearance, and their interaction, controlling for gender and race

Term	*B*	*SE B*	β
Step 1			
Gender	-.09	.03	-.30**
Race	.08	.04	.21^{+}
Condition[a]	-.07	.03	-.26*
CSW (Appearance)	-.01	.02	.10
Step 2			
Gender	-.10	.03	-.33**
Race	.09	.04	.24*
Condition[a]	-.07	.03	-.26*
CSW (Appearance)	.04	.02	.32*
Condition x CSW (Appearance)	-.06	.03	-.30*

Notes. $R^2 > .21$ ($p < .01$) in Step 1, $\Delta R^2 = .05$ in Step 2 ($p < .05$). All β's are non-significant (ps > .05), unless indicated otherwise.
$^{+}p < .10$, $*p < .05$, $**p < .01$
[a] Dummy coded with social exclusion condition = 1 and control condition = 0

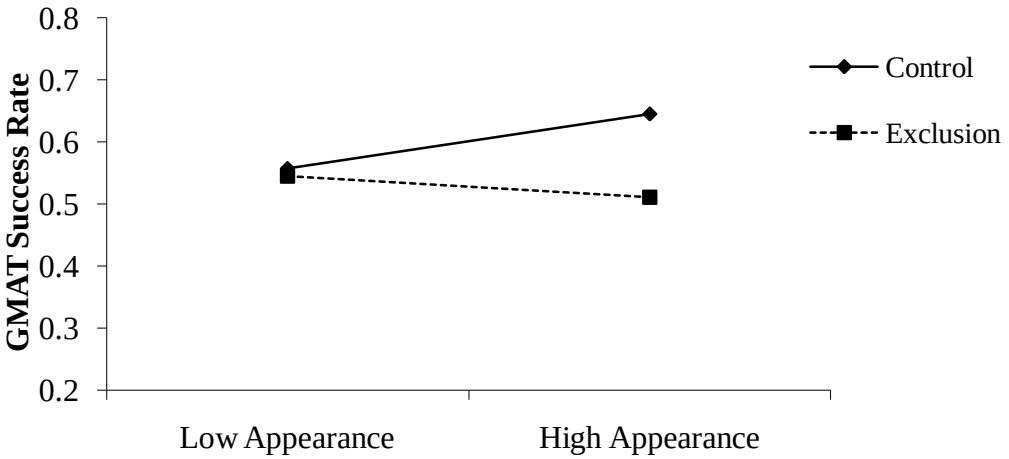

Figure 1. GMAT success rate as a function of social exclusion and contingencies of self-worth based on appearance. Means are depicted for low (-1 *SD*) and high (1 *SD*) contingencies of self-worth based on appearance. Scale ranges from 0 to .8, with higher numbers signifying better scores on the GMAT.

We also found a significant interaction between experimental conditions and self-worth contingent on appearance in predicting the number of problems solved on the intelligence test, $\beta = -.39$, $p < .05$, $\Delta R^2 = .08$ (see Table 3 and Figure 2). Post Hoc analyses revealed that among individuals who were highly contingent on appearance in their self-worth, the exclusion group solved fewer problems than the control group, $\beta = -.44$, $p < .01$. There were no significant differences in problems solved between participants in the control condition who were low in self-worth contingent on appearance, and participants in the control condition who were high in self-worth contingent on appearance, between participants in the exclusion condition who were low in self-worth contingent on appearance and participants in the exclusion condition who were high in self-worth contingent in appearance, and between experimental conditions for participants low in self-worth based on appearance, *p*s > .13.

There was no significant interaction between experimental conditions and appearance contingencies of self-worth in predicting the number of problems attempted on the intelligence test, $p = .61$.

Table 3
Hierarchical regressions of problems solved on the GMAT from social exclusion condition, contingencies of self-worth based on appearance, and their interaction, controlling for gender and race

Term	*B*	*SE B*	β
Step 1			
Gender	-1.18	1.35	-.11
Race	2.67	1.61	.19
Condition[a]	-1.84	1.20	-.17
CSW (Appearance)	-.23	.62	.04
Step 2			
Gender	-1.58	1.31	-.14
Race	3.28	1.58	.24*
Condition[a]	-1.80	1.16	-.17
CSW (Appearance)	1.68	.82	.32*
Condition x CSW (Appearance)	-2.98	1.15	-.38*

Notes. $R^2 = .08$ ($p > .16$) in Step 1, $\Delta R^2 = .07$ in Step 2 ($p < .05$). All β's are non-significant (ps > .05), unless indicated otherwise.
$^{+}p < .10$, $*p < .05$, $**p < .01$
[a] Dummy coded with social exclusion condition = 1 and control condition = 0

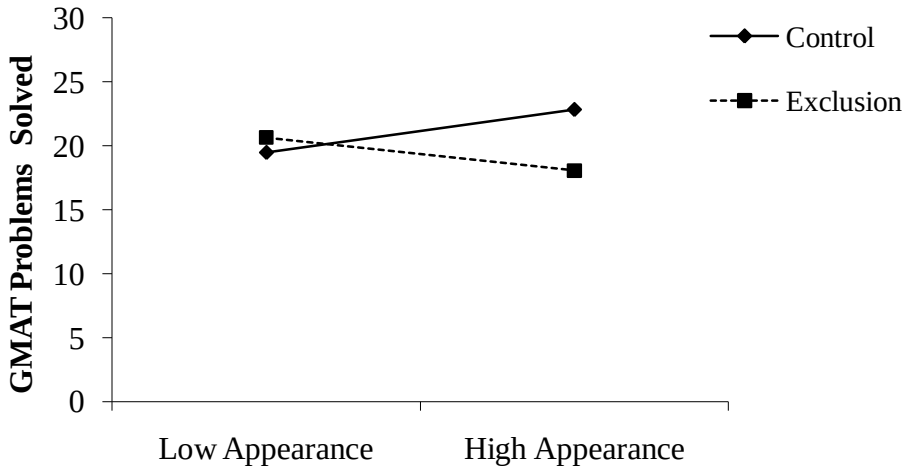

Figure 2. Problems solved on GMAT as a function of social exclusion and contingencies of self-worth based on appearance. Means are depicted for low (-1 *SD*) and high (1 *SD*) contingencies of self-worth based on appearance. Scale ranges from 0 to 25, with higher numbers signifying better scores on the GMAT.

We found a marginally significant interaction between experimental conditions and self-worth contingent on appearance in predicting working memory capacity, $\beta = -.27$, $p < .10$, $\Delta R^2 = .04$ (see Table 4 and Figure 3). Post Hoc analyses revealed that among individuals who based their self-worth highly on appearance, the exclusion group recalled fewer words than the control group, $\beta = -.37$, $p < .05$. There were no significant differences in working memory capacity between participants in the control condition who were low in self-worth contingent on appearance, and participants in the control condition who were high in self-worth contingent on appearance, between participants in the exclusion condition who were low in self-worth contingent on appearance and participants in the exclusion condition who were high in self-worth contingent in appearance, and between experimental conditions for participants low in self-worth based on appearance,, *p*s > .82.

Table 4
Hierarchical regressions of working memory capacity from social exclusion condition, contingencies of self-worth based on appearance, and their interaction, controlling for gender and race

Term	*B*	*SE B*	β
Step 1			
Gender	-4.15	3.41	-.15
Race	-2.14	4.09	-.06
Condition[a]	-4.77	3.05	-.17
CSW (Appearance)	2.26	1.56	.17
Step 2			
Gender	-4.88	3.39	-.17
Race	-1.04	4.08	-.03
Condition[a]	-4.70	3.01	-.17
CSW (Appearance)	4.85	2.12	.37*
Condition x CSW (Appearance)	-5.34	2.99	-.27^{+}

Notes. $R^2 > .07$ (p = .22) in Step 1, $\Delta R^2 = .04$ in Step 2 (p < .08). All β's are non-significant (ps > .05), unless indicated otherwise.
$^{+}p < .10$, $*p < .05$, $**p < .01$, $***p < .001$
[a] Dummy coded with socially exclusion condition = 1 and control condition = 0

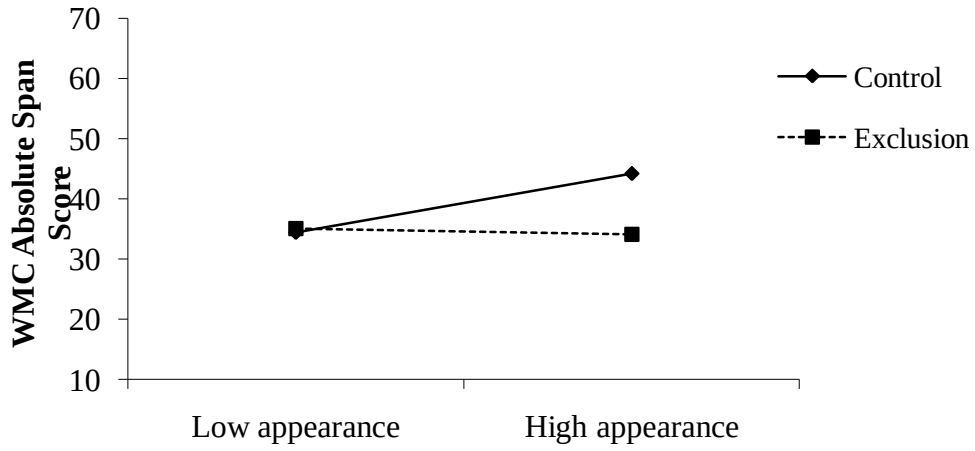

Figure 3. Working memory capacity as function of social exclusion and contingencies of self-worth based on appearance. Means are depicted for low (-1 *SD*) and high (1 *SD*) contingencies of self-worth based on appearance. Scale ranges from 0 to 50, with higher numbers signifying a higher recall of words on the Operation Span Task.

Other's Approval Contingency of Self-Worth. We found a marginally significant interaction between experimental conditions and self-worth contingent on other's approval in predicting intelligence test success rate, $\beta = -.24$, $p < .10$, $\Delta R^2 = .03$ (see Table 5 and Figure 4). Post Hoc analyses revealed that among participants who were highly contingent on approval in their self-worth, the exclusion group performed worse than the control group on the intelligence test, $\beta = -.40$, $p < .01$. There were no significant differences in success rates between participants in the control condition who were low in self-worth contingent on approval, and participants in the control condition who were high in self-worth contingent on approval, between participants in the exclusion condition who were low in self-worth contingent on approval and participants in the exclusion condition who were high in self-worth contingent in approval, and between experimental conditions for participants low in self-worth based on approval, *p*s > .56.

Table 5
Hierarchical regressions of GMAT success rate from social exclusion condition, contingencies of self-worth based on approval, and their interaction, controlling for gender and race

Term	*B*	*SE B*	β
Step 1			
Gender	-.09	.03	-.29
Race	.07	.04	.20**
Condition[a]	-.08	.03	-.27*
CSW (Approval)	.02	.02	.10
Step 2			
Gender	-.09	.03	-.30**
Race	.08	.04	.20^{+}
Condition[a]	-.08	.03	-.27*
CSW (Approval)	.04	.02	.27^{+}
Condition x CSW (Approval)	-.05	.03	-.24^{+}

Notes. $R^2 > .21$ ($p < .01$) in Step 1, $\Delta R^2 = .03$ in Step 2 ($p < .01$). All β's are non-significant (ps > .05), unless indicated otherwise.
$^{+}p < .10$, $*p < .05$, $**p < .01$
[a] Dummy coded with social exclusion condition = 1 and control condition = 0

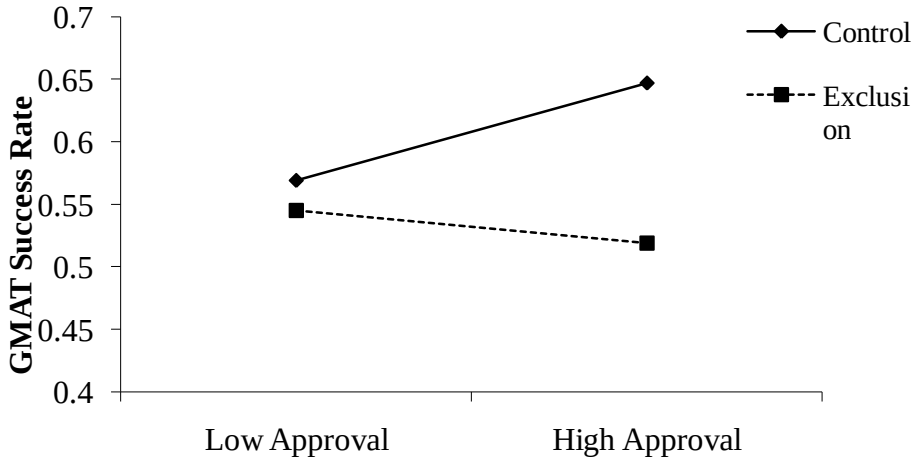

Figure 4. GMAT success rate as a function of social exclusion and contingencies of self-worth based on approval Means are depicted for low (-1 *SD*) and high (1 *SD*) contingencies of self-worth based on approval. Scale ranges from 0 to .7, with higher numbers signifying better scores on the GMAT.

We found a significant interaction between experimental conditions and self-worth contingent on other's approval in predicting the number of problems solved on the intelligence test, $\beta = -.31$, $p < .05$, $\Delta R^2 = .05$ (see Table 6 and Figure 5). Post Hoc analyses revealed that among individuals who were highly contingent on approval in their self-worth, the social exclusion group solved fewer problems than the control group, $\beta = -.38$, $p < .01$. There were no significant differences in problems solved between participants in the control condition who were low in self-worth contingent on approval, and participants in the control condition who were high in self-worth contingent on approval, between participants in the exclusion condition who were low in self-worth contingent on approval and participants in the exclusion condition who were high in self-worth contingent in approval, and between experimental conditions for participants low in self-worth based on approval, ps > .14.

Table 6
Hierarchical regressions of problems solved on the GMAT from social exclusion condition, contingencies of self-worth based on approval, and their interaction, controlling for gender and race

Term	*B*	*SE B*	β
Step 1			
Gender	-1.13	1.30	-.10
Race	2.63	1.63	.19
Condition[a]	-1.89	1.19	-.17
CSW (Approval)	.25	.64	.04
Step 2			
Gender	-1.33	1.28	-.12
Race	2.66	1.60	.19^{+}
Condition[a]	-1.85	1.17	-.17
CSW (Approval)	1.44	.84	.26^{+}
Condition x CSW (Approval)	-2.58	1.21	-.31*

Notes. R^2 = .08 (p > .16) in Step 1, ΔR^2 = .05 in Step 2 (p < .01). All β's are non-significant (ps > .05), unless indicated otherwise.
$^{+}p < .10$, $*p < .05$, $**p < .01$
[a] Dummy coded with social exclusion condition = 1 and control condition = 0

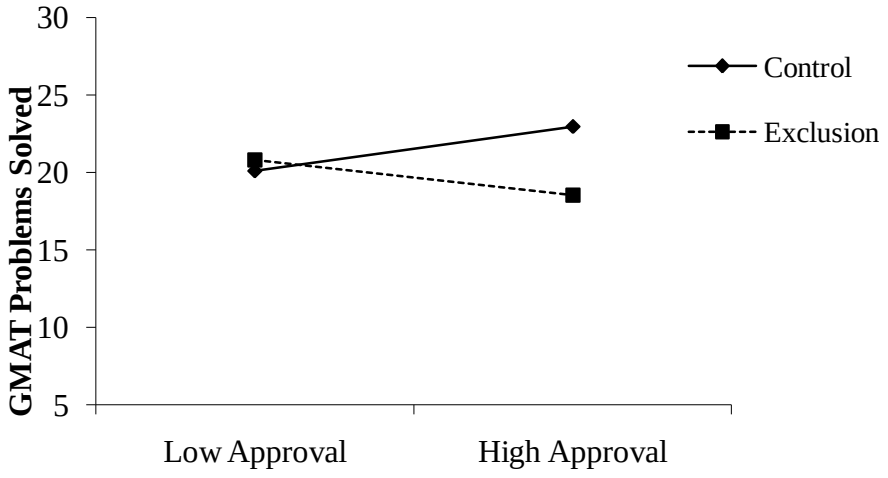

Figure 5. Problems solved correctly on GMAT as a function of social exclusion and contingencies of self-worth based on approval. Means are depicted for low (-1 *SD*) and high (1 *SD*) contingencies of self-worth based on approval. Scale ranges from 0 to 25, with higher numbers signifying better scores on the GMAT.

There was no significant interaction between experimental conditions and the other's approval contingency of self-worth in predicting the number of problems attempted on an intelligence test or in predicting working memory capacity, *p*s > .71.

Competition Contingency of Self-Worth. We found a marginally significant interaction between experimental conditions and self-worth contingent on competition predicting the number of problems solved on the intelligence test, $\beta = -.28$, $p < .10$, $\Delta R^2 = .04$ (see Table 7 and Figure 6). Post Hoc analyses revealed that among participants who based their self-esteem strongly on competition, the social exclusion group solved fewer problems than the control group $\beta = -.39$, $p < .05$. There were no significant differences in problems solved between participants in the control condition who were low in self-worth contingent on competition, and participants in the control condition who were high in self-worth contingent on competition, between participants in the exclusion condition who were low in self-worth contingent on competition and participants in the exclusion condition who were high in self-worth contingent in competition, and between experimental conditions for participants low in self-worth based on competition, *p*s > .13.

Table 7
Hierarchical regressions of problems solved on the GMAT from social exclusion condition, contingencies of self-worth based on competition, and their interaction, controlling for gender and race

Term	*B*	*SE B*	β
Step 1			
Gender	-1.10	1.30	-.10
Race	2.68	1.62	.19
Condition[a]	-1.97	1.22	-.18
CSW (Competition)	-.19	.64	-.04
Step 2			
Gender	-1.44	1.30	-.13
Race	3.22	1.62	.23^{+}
Condition[a]	-1.97	1.20	-.18
CSW (Competition)	.84	.85	.15
Condition x CSW (Competition)	-2.28	1.27	-.28^{+}

Notes. R^2 = .08 (p > .16) in Step 1, ΔR^2 = .04 in Step 2 (p < .08). All β's are non-significant (ps > .05), unless indicated otherwise.
$^{+}p < .10$, $*p < .05$, $**p < .01$
[a] Dummy coded with social exclusion condition = 1 and control condition = 0

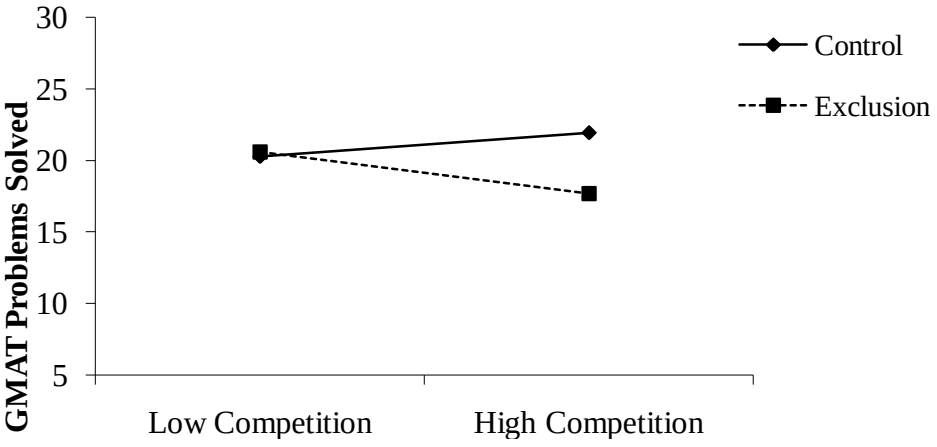

Figure 6. Problems solved on GMAT as a function of social exclusion and contingencies of self-worth based on competition. Means are depicted for low (-1 *SD*) and high (1 *SD*) contingencies of self worth based on competition. Scale ranges from 0 to 25, with higher numbers signifying better scores on the GMAT.

We found a marginally significant interaction between experimental conditions and self-worth contingent on competition in predicting working memory capacity, $\beta = -.27$, $p < .10$, $\Delta R^2 = .04$ (see Table 8 and Figure 7). Post Hoc analyses revealed that among participants in the exclusion group highly contingent on competition in their self-worth recalled fewer words than the control group, $\beta = -.41$, $p < .05$. There were no significant differences in working memory capacity between participants in the control condition who were low in self-worth contingent on competition, and participants in the control condition who were high in self-worth contingent on competition, between participants in the exclusion condition who were low in self-worth contingent on competition and participants in the exclusion condition who were high in self-worth contingent in competition, and between experimental conditions for participants low in self-worth based on competition, ps > .16.

Table 8
Hierarchical regressions of working memory capacity from social exclusion condition, contingencies of self-worth based on competition, and their interaction, controlling for gender and race

Term	*B*	*SE B*	β
Step 1			
Gender	-2.67	3.35	-.10
Race	-1.47	4.16	-.04
Condition[a]	-5.49	3.12	-.20^{+}
CSW (Competition)	-.35	1.63	-.03
Step 2			
Gender	-3.52	3.34	-.13
Race	-.14	4.18	-.004
Condition[a]	-5.49	3.08	-.20^{+}
CSW (Competition)	2.16	2.18	.16
Condition x CSW (Competition)	-5.6	3.26	-.27^{+}

Notes. $R^2 > .04$ ($p > .44$) in Step 1, $\Delta R^2 = .04$ in Step 2 ($p < .10$). All β's are non-significant (ps > .05), unless indicated otherwise.
$^{+}p < .10$, $*p < .05$, $**p < .01$, $***p < .001$
[a] Dummy coded with social exclusion condition = 1 and control condition = 0

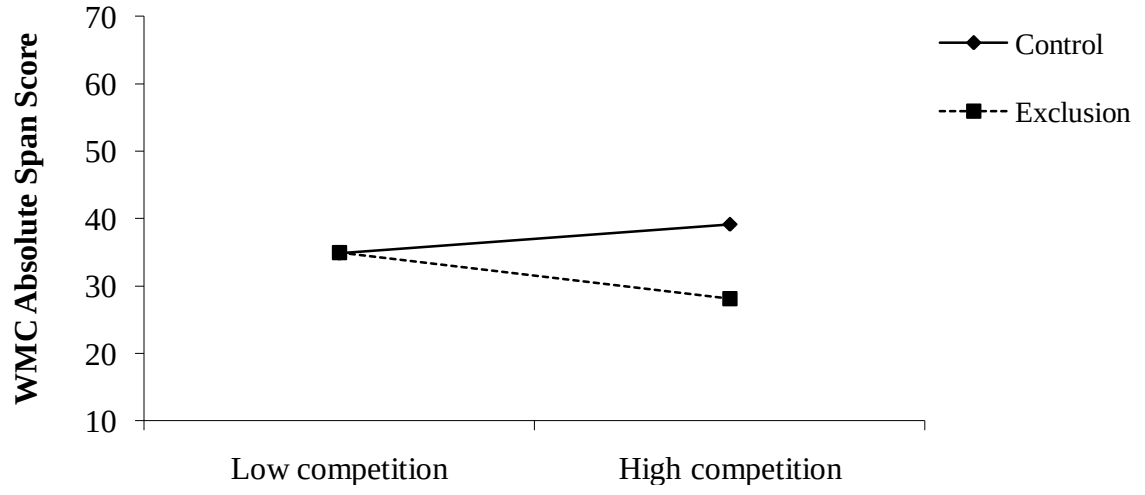

Figure 7. Working memory capacity as function of social exclusion and contingencies of self-worth based on competition. Means are depicted for low (-1 *SD*) and high (1 *SD*) contingencies of self-worth based on competition. Scale ranges from 0 to 45, with higher numbers signifying a higher recall of words on the Operation Span Task.

There were no significant interactions between experimental conditions and the competition contingency of self-worth in predicting success rate or number of problems attempted on the intelligence test, *p*s > .13.

Academic Contingency of Self-Worth. There were no significant interactions between experimental conditions and academic contingency of self-worth in predicting intelligence test success rate, number of problems solved, or number of problems attempted, or working memory capacity, *p*s > .17.

Combining the Appearance and Approval Contingencies of Self-Worth. The appearances and approval subscales of the CSW scale correlated highly, r(80) = .56, $p < .01$: this justified creating an composite average score of the two subscales to form a scale measuring contingencies of self-worth based on appearance and approval combined, as suggested by Crocker et al. (2003). We found a significant interaction between experimental conditions and self-worth based on external contingencies in predicting intelligence test success rate, $\beta = -.26$, $p < .05$, $\Delta R^2 = .04$ (see Table 9 and Figure 8). Post Hoc analyses revealed that among individuals who based their self-esteem strongly on external contingencies, the exclusion group performed worse than the control group on the intelligence test, $\beta = -.46$, $p < .01$. There were no significant differences in success rates between participants in the control condition who were low in self-worth contingent on appearance and approval combined, and participants in the control condition who were high in self-worth contingent on appearance and approval combined, between participants in the exclusion condition who were low in self-worth contingent on appearance and approval combined and participants in the exclusion condition who were high in self-worth contingent in appearance and approval combined, and between experimental conditions for participants low in self-worth based on appearance and approval combined, *p*s > .27.

Table 9

Hierarchical regressions of GMAT success rate from social exclusion condition, self-worth based on contingencies of appearance and approval combined, and their interaction, controlling for gender and race

Term	*B*	*SE B*	β
Step 1			
Gender	-.06	.03	-.19^{+}
Race	.14	.03	.39***
Condition[a]	-.08	.03	-.25*
CSW (Appearance and Approval)	.01	.01	.08
Step 2			
Gender	-.07	.03	-.20*
Race	.14	.03	.41***
Condition[a]	-.08	.03	-.26**
CSW (Appearance and Approval)	.04	.02	.05^{+}
Condition x CSW (Appearance and Approval)	-.06	.03	-.26*

Notes. $R^2 > .24$ ($p < .01$) in Step 1, $\Delta R^2 = .04$ in Step 2 ($p < .05$). All β's are non-significant (ps > .05), unless indicated otherwise.

$^{+}p < .10$, $*p < .05$, $**p < .01$, $***p < .001$

[a] Dummy coded with social exclusion condition = 1 and control condition = 0

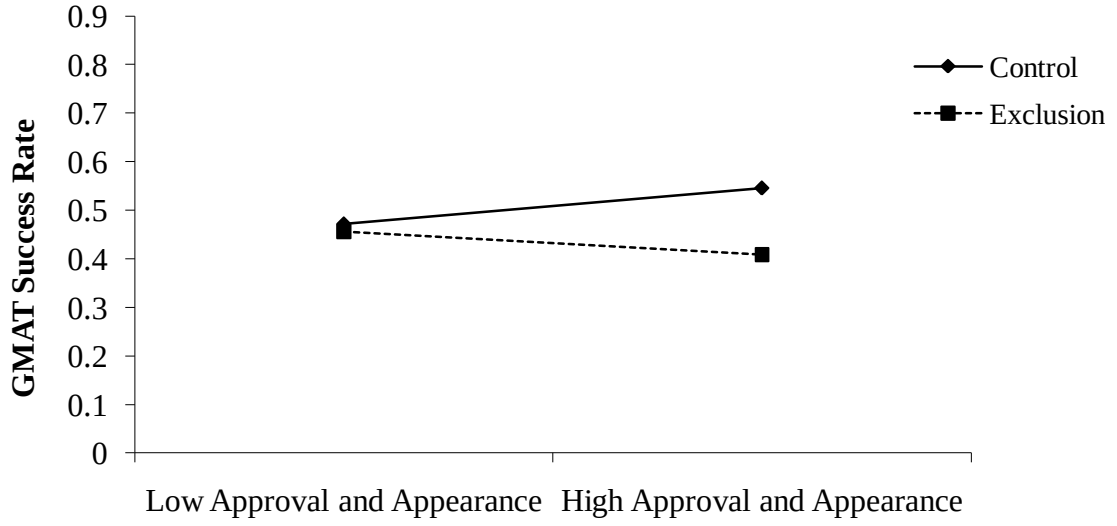

Figure 8. GMAT success rate as a function of social exclusion and self-worth based on contingencies of appearance and approval combined. Means are depicted for low (-1 *SD*) and high (1 *SD*) self-worth based on appearance and approval combined. Scale ranges from 0 to .6, with higher number signifying better scores on the GMAT.

We also found a highly significant interaction between experimental conditions and self-worth based on contingencies of appearance and approval combined in predicting the number of problems solved on the intelligence test, $\beta = -.35$, $p < .01$, $\Delta R^2 = .07$ (see Table 10 and Figure 9). Post Hoc Analyses revealed that among individuals who based their self-esteem highly on external contingencies, the exclusion group solved fewer problems than the control group, $\beta = -.44$, $p < .01$. We also found that in the social exclusion condition, people with low self-worth based on contingencies of appearance and approval combined tended to solve more problems on the intelligence test than people with high self-worth based on contingencies of approval and appearance combined, $\beta = -.30$, $p < .10$. There were no significant differences in success rates between participants in the control condition who were low in self-worth contingent on appearance and approval combined, and participants in the control condition who were high in self-worth contingent on appearance and approval combined, between participants in the exclusion condition who were low in self-worth contingent on appearance and approval combined and participants in the exclusion condition who were high in self-worth contingent in appearance and approval combined, ps > .44.

Table 10

Hierarchical regressions of problems solved on the GMAT from social exclusion condition, self-worth based on contingencies of appearance and approval combined, and their interaction, controlling for gender and race

Term	*B*	*SE B*	β
Step 1			
Gender	-.09	1.29	.01
Race	5.22	1.40	.39***
Condition[a]	-1.87	1.17	-.16
CSW (Appearance and Approval)	.18	.61	.03
Step 2			
Gender	-.29	1.25	-.02
Race	5.57	1.35	.41***
Condition[a]	-1.97	1.13	-.17^{+}
CSW (Appearance and Approval)	1.49	.75	.26*
Condition x CSW (Appearance and Approval)	-3.19	1.14	-.35**

Notes. $R^2 > .24$ ($p < .01$) in Step 1, $\Delta R^2 = .04$ in Step 2 ($p < .05$). All β's are non-significant (ps > .05), unless indicated otherwise.

$^{+}p < .10$, $*p < .05$, $**p < .01$, $***p < .001$

[a] Dummy coded with social exclusion condition = 1 and control condition = 0

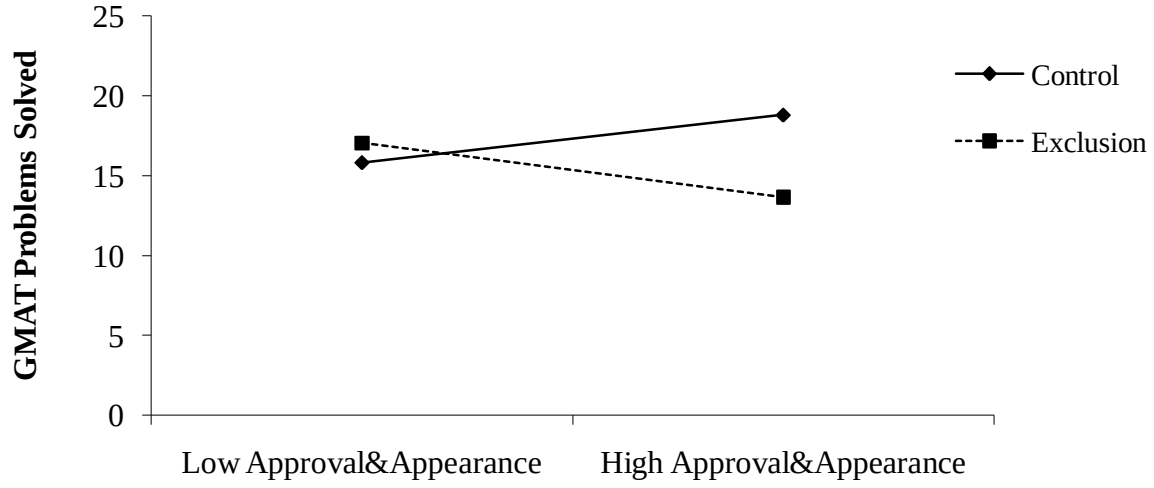

Figure 9. Problems solved on GMAT as a function of social exclusion and self-worth based on contingencies of appearance and approval combined. Means are depicted for low (-1 *SD*) and high (1 *SD*) self-worth based on contingencies of appearance and approval combined. Scale ranges from 0 to 20, with higher number signifying better scores on the GMAT.

There were no significant interactions between experimental conditions and the contingencies of appearance and approval combined in predicting the number of problems attempted on the intelligence test, or in predicting working memory capacity, *p*s > .26.

Rejection Sensitivity. There were no significant interactions between experimental conditions and rejection sensitivity in predicting intelligence test success rate, number of problems solved, or number of problems attempted, or working memory capacity, *p*s > .49.

Discussion

In general our hypotheses received support. First of all, we found that people exhibited significant cognitive decrements after they were told no one wanted to work with them. This effect is consistent with current findings that ego-threats, specifically social exclusion, reduce people's capacity for intelligent thought (Baumeister, Twenge, & Nuss, 2002; Schmader & Johns, 2003). The manipulation of social exclusion caused people to perform more poorly on the intelligence test and recall fewer words on the working memory capacity measure. Trending in the same direction, social exclusion caused people to attempt less problems as well as make more errors on those they did attempt.

Also, we found that individual differences in contingencies of self-worth, specifically appearance, others' approval, and competition moderated the effects of experimental condition on working memory capacity and intellectual performance. We found that individuals in the social exclusion group with high contingent self-esteem in appearance and other's approval performed more poorly on the intelligence test. The effects of social exclusion appear to be specific to individuals who base their self-esteem on socially relevant contingencies which confirms previous findings that contingencies of self-worth based on other's approval and appearance are more difficult to satisfy because they are more outside of one's control (Crocker

& Wolfe, 2001). Contingencies of self-worth based on other's approval and appearance were also highly correlated indicating that socially excluded individuals high in contingencies of other's approval and appearance are very invested in what other people think of them and attribute their exclusion to failing in the eyes of their peers on these dimensions. This in turns is reflected in their poor performances on cognitive measures.

We also found that individuals in the exclusion group with high contingent self-esteem in appearance and competition recalled fewer words on the working memory capacity test. However, there were no interactions with contingencies of self-worth based on other's approval between experimental groups in the working memory capacity measure. This inconsistency is notable because contingencies of self-worth based on appearance and approval are highly correlated (Crocker & Wolfe, 2001). One would expect both contingencies of self-worth based on approval and appearance to moderate effects of social exclusion on working memory capacity. We believe there are two potential reasons for this missing interaction. In general, working memory capacity exhibited a weaker effect than the intelligence measure. In order to have significant interactions between external contingencies of self-worth and experimental conditions on working memory capacity in way we predicted, a main effect or a trend for a main effect must be present. Also, our modifications of the Operation-Span Task may have changed the psychological meaning of the measure which ultimately could have interfered with the joint impact of social exclusion and self-worth contingent on other's approval.

There were no significant interactions between rejection sensitivity and contingencies of self-worth based on appearance, other's approval, and competition (in predicting impaired cognitive functioning, suggesting that individual's anxious expectation of rejection may not influence social exclusion's effects on cognitive impairment. However, we found significant

interactions between social exclusion condition and contingencies of self-worth in predicting cognitive impairment. This suggests that social exclusion's negative effects may be related more to the degree people are invested in their self-worth rather than a global social need of belonging. These findings contradict current claims represented in the social exclusion literature (Baumeister & Leary, 1995).

In this case rejection sensitivity did not moderate effects of social exclusion on cognitive performance, but we realize there is a social component in our chosen contingencies of self-worth. Consequently we do not wish to rule out the possibility of other socially invested moderators. Future research should address the influence of additional moderators such as the fear of negative evaluation (Leary, 1983) on the cognitive effects of social exclusion. We believe that an individual's fear of negative evaluation may also play a role in social exclusion's cognitive consequences.

One limitation of the present work is the sample size. Increasing the number of participants would decrease error in working memory capacity and increase the likelihood of significance. Another limitation may be due to the time period data collection took place which was the last two weeks of a quarter. Participants may be less motivated during this time, because they are more focused on fulfilling requirements for their introductory psychology class. Future directions may include a replication study with data collection at the beginning of a quarter, using the original Operation-Span Task, which involves counting vowels in a sentence in between , increasing the sample size, and including other moderators (e.g. fear of negative evaluation) into the study. Additionally it would be interesting to see if the moderators that play a role in social exclusion's effect on cognitive functioning also accounts for other negative effects of social exclusion (e.g. increased aggression; Buckley, Winkel, & Leary, 2004).

Our results are consistent with the view that social exclusion reduces cognitive performance (Baumeister, Twenge, & Nuss, 2002; Schmader & Johns, 2003) and we propose this effect may be attributed to contingencies of self-worth. Understanding the effects of social exclusion and why they occur is important, because most people have experienced social exclusion at some point in their lives and it leads to increased aggression, self-defeating and self-destructive behavior, and decreased intelligent thought (Twenge et al., 2001; Twenge, Catanese, & Baumeister, 2002; Twenge, Catanese, & Baumeister, 2003). Intelligent thought is crucial to acting constructively in situations where our self-esteem is challenged. This research could illuminate our understanding of why a rejection experience interferes with our ability to think in testing situations similar to the one described in the introduction.

References

Aiken, L. S., & West, S.G. (1991). *Multiple regression: Testing and interpreting interactions*. United States of America: Sage Publications.

Baumeister, R.F., Dewall, C.N., Ciarocco, N.J., & Twenge, J.M. (2005). Social Exclusion Impairs Self-Regulation. *Journal of Personality and Social Psychology, 88*, 589-604.

Baumeister, R.F., & Leary, M.R. (1995). The need to belong: Desire for interpersonal attachments as a fundamental human motivation. *Psychological Bulletin, 117*, 497-529.

Baumeister, R.F., Twenge, J.M., & Nuss, C. (2002). Effects of social exclusion on cognitive processes: Anticipated aloneness reduces intelligent thought. *Journal of Personality and Social Psychology, 83*, 817-827.

Bhatti, B., Derezotes, D., Kim, S., and Specht, D. (1989) The association between child maltreatment and self-esteem. In Mecca, A.M., Smelser, N.J., & Vasconcellos, J.(Eds.) The Social Importance of Self-Esteem, Berkeley , CA.: University of California Pres.

Buckley, K. E., Winkel, R. E., & Leary M. R. (2004). Reactions to acceptance and rejection: Effects of level and sequence of relational evaluation. *Journal of Experimental Social Psychology, 40,* 14-28.

Crocker, J., & Wolfe, C. T. (2001). Contingencies of self-worth. *Psychological Review,* 108, 593-623.

Crocker, J., Luhtanen, R. K., Cooper, M. L., & Bouvrette, S. (2003). Contingencies of self-worth in college students: Theory and measurement. *Journal of Personality and Social Psychology*, 85, 894-908.

Crocker, J., & Knight, K. M. (2005). Contingencies of self-worth. *Current Directions in Psychological Science*, 14, 200-203.

Deci, E. L., & Ryan, R. M. (1995). Human autonomy: The basis for true self-esteem. In M. Kernis (Ed.), *Efficacy, agency, and self-esteem* (pp. 31-49). New York: Plenum Publishing Co.

Downey, G., & Feldman, S. I. (1996) Implications of rejection sensitivity for intimate relationships. *Journal of Personality and Social Psychology*, 70(6), 1327-1343.

Feldman, S., & Downey, G. (1994). Rejection sensitivity as a mediator of the impact of childhood exposure to family violence on adult attachment behavior. *Development and Psychopathology*, 3, 231-247.

Fredrickson B. L., et al., (1998). That swimsuit becomes you: sex differences in self objectification, restrained eating, and math performance. *Journal of Personality and Social Psychology*, 75(1), 269-284.

Hamacheck, D. (1992). *Encounters with the self* (4th ed.). San Diego, CA: Harcourt Brace Jovanovich.

Heatherton, T.F., & Vohs, K. D. (2000). Interpersonal evaluations following threats to self: Role of self-esteem. *Journal of Personality and Social Psychology, 78*, 725-736.

Kiecolt-Glaser, J. K., Garner, W., Speicher, C., Penn, G. M., Holliday, J., & Glaser, R. (1984). Psychosocial modifiers of immunocompetence in medical students. *Psychosomatic Medicine*, 46, 7-14.

Janda, L. (1996). *The psychologists' book of self-tests*. New York: Berkley.

Javis, B. G. (2012). DirectRT (Version 2012) [Computer Software]. New York, NY: Empirisoft Corporation.

Jarvis, B. G. (200x). MediaLab (Version 2008.1.33) [Computer Software]. New York, NY:EmpirisoftCorporation.

Leary, M. R., Terry, M. L., Allen, A. B., & Tate, E. B. (2009). The concept of ego threat in social and personality psychology: In ego threat a viable scientific construct? *Personality and Social Psychology Review, 13*, 151-164.

Nezlek, J. B., Kowalski, R. M., Leary, M. R., Blevins, T., & Holgate, S. (1997). Personality moderators of reactions to interpersonal rejection: Dispositional depression and trait self-esteem. *Personality and Social Psychology Bulletin,23*, 1235-1244.

Kane, M. J., & Engle, R. W. (2003). Working memory capacity and the control of attention: The contributions of goal neglect, response competition, and task set to Stroop interference. *Journal of Experimental Psychology: General*, *132*, 47-70.

Kane, M. J., Brown, L. E., Little, J. C., Silvia, P. J., Myin-Germeys, I., & Kwapil, T. R. (2007). For who the mind wanders, and when: An experience-sampling study of working memory and executive control in daily life. *Psychological Science*, 18, 614-621.

Park, L. E., Sanchez, D. T., & Brynildsen, K. (2011). Maladaptive responses to romantic breakup: The role of relationship contingent self-worth. Journal of Applied Social Psychology, 41, 1749-1773.

Rosen, V. M., & Engle, R. W. (1998). Working memory capacity and suppression. *Journal of Memory and Language*, 39, 418-436.

Ryan, R. M., & Deci, E. L. (2001). On happiness and human potentials: A review of research on hedonic and eudaimonic well-being. In S. Fiske (Ed), *Annual review of psychology* (pp. 141-166). Palo Alto, CA: Annual Reviews, Inc.

Schlenker, B., & Leary, M. R. (1982). Social anxiety and self-presentation: A conceptualization and model. *Psychological Bulletin*, 92, 641-669.

Schmader, T. & Johns, M. (2003). Converging evidence that stereotype threat reduces working memory capacity. *Journal of Personality and Social Psychology*, 85(3), 440-452.

Schmader, T. , Johns, M., & Forbes, C. (2008). An integrated process model of stereotype threat effects on performance.* *Psychological Review*, 115, 336-356.

Steele, C. M. (1997). A threat in the air: How stereotypes shape intellectual identity and performance. *American Psychologist, 52*(6), 613-629.

Twenge, J.M., Baumeister, R.F., DeWall, C.N., Ciarocco, N.J., & Bartels, J.M. (2007). Social exclusion decreases prosocial behavior. *Journal of Personality and Social Psychology, 92*, 56-66.

Twenge, J. M., Catanese, K. R., & Baumeister, R. F. (2002). Social exclusion causes self-defeating behavior. *Journal of Personality and Social Psychology, 83*, 606-615.

Unsworth, N., & Engle, R.W. (2007). The nature of individual differences in working memory capacity: Active maintenance in primary memory and controlled search from secondary memory. *Psychological Review*, 114, 104-132.